

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No.: 10/781,906
Atty Docket No.: Q80049

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

Claim 1. (currently amended): A magnetic recording medium comprising:
a non-magnetic substrate;
at least a soft magnetic undercoat film comprising a soft magnetic material and formed on the non-magnetic substrate;
an orientation control film formed on the soft magnetic undercoat film for controlling an orientation of a film directly above the orientation control film;
a perpendicular magnetic film which is formed on the orientation control film and has an axis of easy magnetization oriented mainly perpendicularly with respect to the substrate; and
a protection film formed on the perpendicular magnetic film,
wherein the perpendicular magnetic film has a structure in which ~~a large number of~~ magnetic grains are separated by a grain boundary layer, and an average separating distance between the magnetic grains along a straight line which connects centers of gravity of mutually neighboring magnetic grains is 1 nm or greater, and
wherein the perpendicular magnetic film comprises a CoPtX ~~type~~ alloy (X being at least one of SiO₂, SiO, Si₃N₄, Al₂O₃, AlN, TiO, TiO₂, TiN, BN, CaF₂, and TiC), and when an X concentration in the magnetic grains is c1, and an X concentration in the grain boundary layer is c2, c2/c1 is 1.4 or greater.

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Claim 2. (currently amended): A magnetic recording medium comprising:

a non-magnetic substrate;

at least a soft magnetic undercoat film comprising a soft magnetic material and formed on the non-magnetic substrate;

an orientation control film formed on the soft magnetic undercoat film for controlling an orientation of a film directly above the orientation control film;

a perpendicular magnetic film which is formed on the orientation control film and has an axis of easy magnetization oriented mainly perpendicularly with respect to the substrate; and

a protection film formed on the perpendicular magnetic film,

wherein the perpendicular magnetic film has a structure in which ~~a large number of~~ magnetic grains are separated by a grain boundary layer, and an average separating distance between the magnetic grains along a straight line which connects centers of gravity of mutually neighboring magnetic grains is 1 nm or greater, and

wherein the perpendicular magnetic film comprises a CoCrPtX ~~type~~ alloy (X being at least one of SiO₂, SiO, Si₃N₄, Al₂O₃, AlN, TiO, TiO₂, TiN, BN, CaF₂, and TiC), and when an X concentration in the magnetic grains is c1, and an X concentration in the grain boundary layer is c2, c2/c1 is 1.4 or greater.

Claim 3. (original): A magnetic recording medium according to claim 1, wherein an average grain diameter of the crystal grains is 4 to 12 nm.

Claim 4. (original): A magnetic recording medium according to claim 2, wherein an average grain diameter of the crystal grains is 4 to 12 nm.